

# Combined Operations Plan

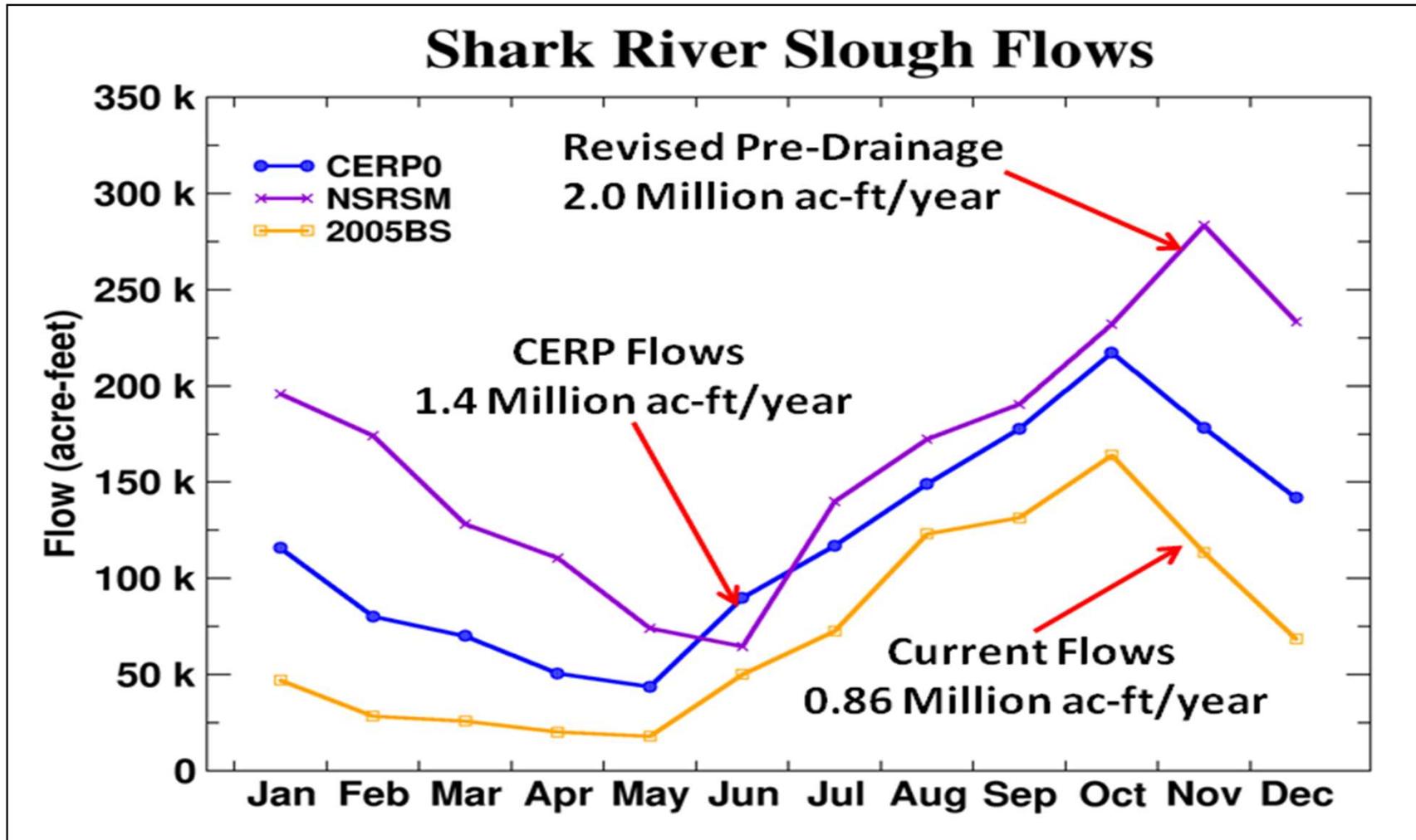
Briefing for the South Florida Ecosystem  
Restoration Task Force

April 2019



Removal of old Tamiami Trail  
roadbed: 10/23/2018

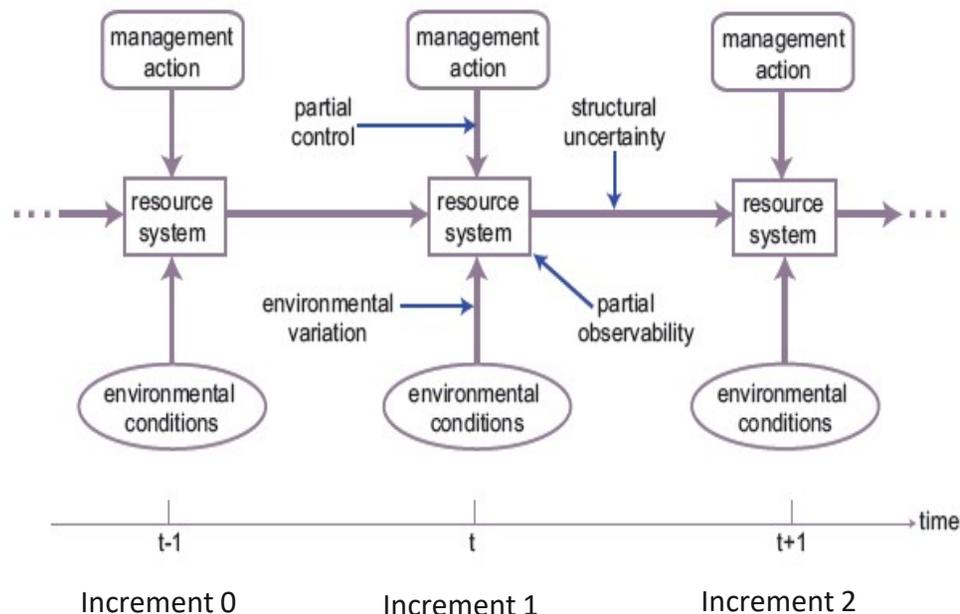
# Seasonality of Flows across mid Shark Slough



# The relevance of Adaptive Management

## Managing expectations vs. managing the critical path toward restoration

“Adaptive management is a formal process for continually improving management policies and practices by learning from their outcomes (Taylor et al., 1997). In the context of Everglades restoration, CERP adaptive management is a structured management approach for addressing uncertainties by testing hypotheses, linking science to decision making, and adjusting implementation, as necessary, to improve the probability of restoration success.”

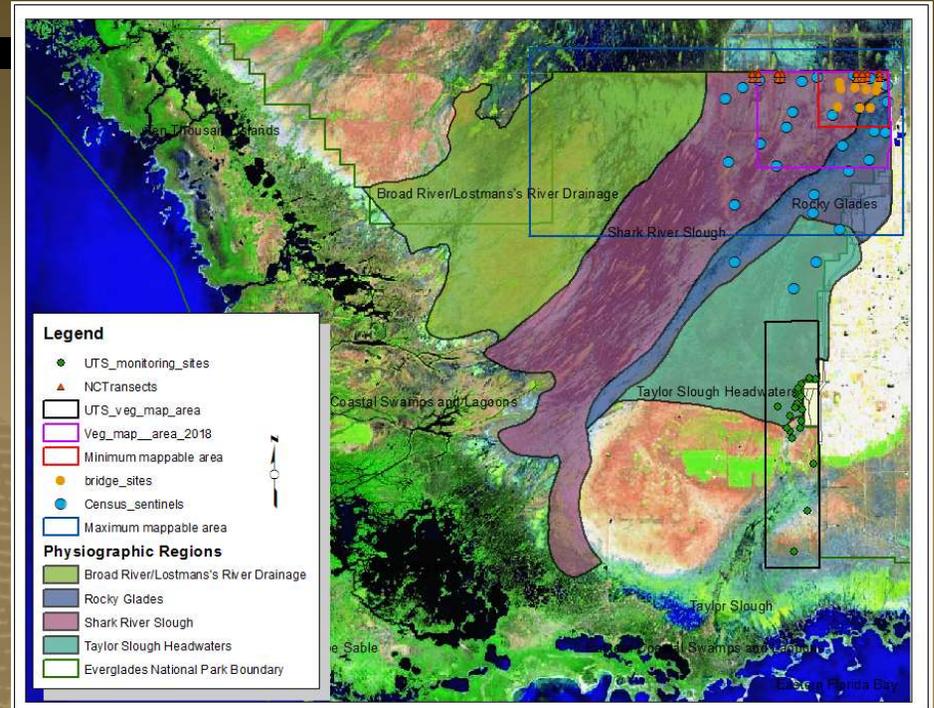
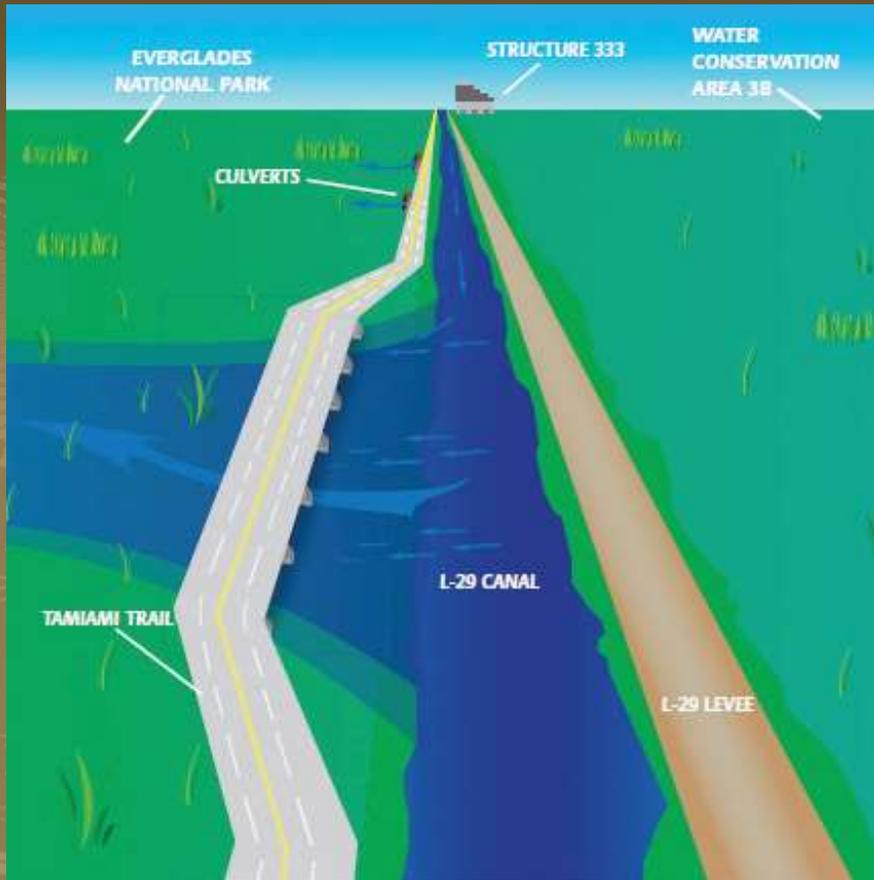


**Figure 5.2.** Uncertainty sources in natural resource management. Partial control limits the influence of management actions. Environmental variation affects resource system status and dynamics. Partial observability limits the recognition of system status. Structural uncertainty limits the ability to characterize system change.

From Williams et al. 2007: this figure identifies the sources of uncertainty associated with management decisions of large scale/complex systems.

# Outline

- Environmental benefits derived from the project
- Project description – scale, objectives, constraints and considerations
- Status of the planning process – on track for completing draft Environmental Assessment by June 30, 2019 (with significant subsequent public review)



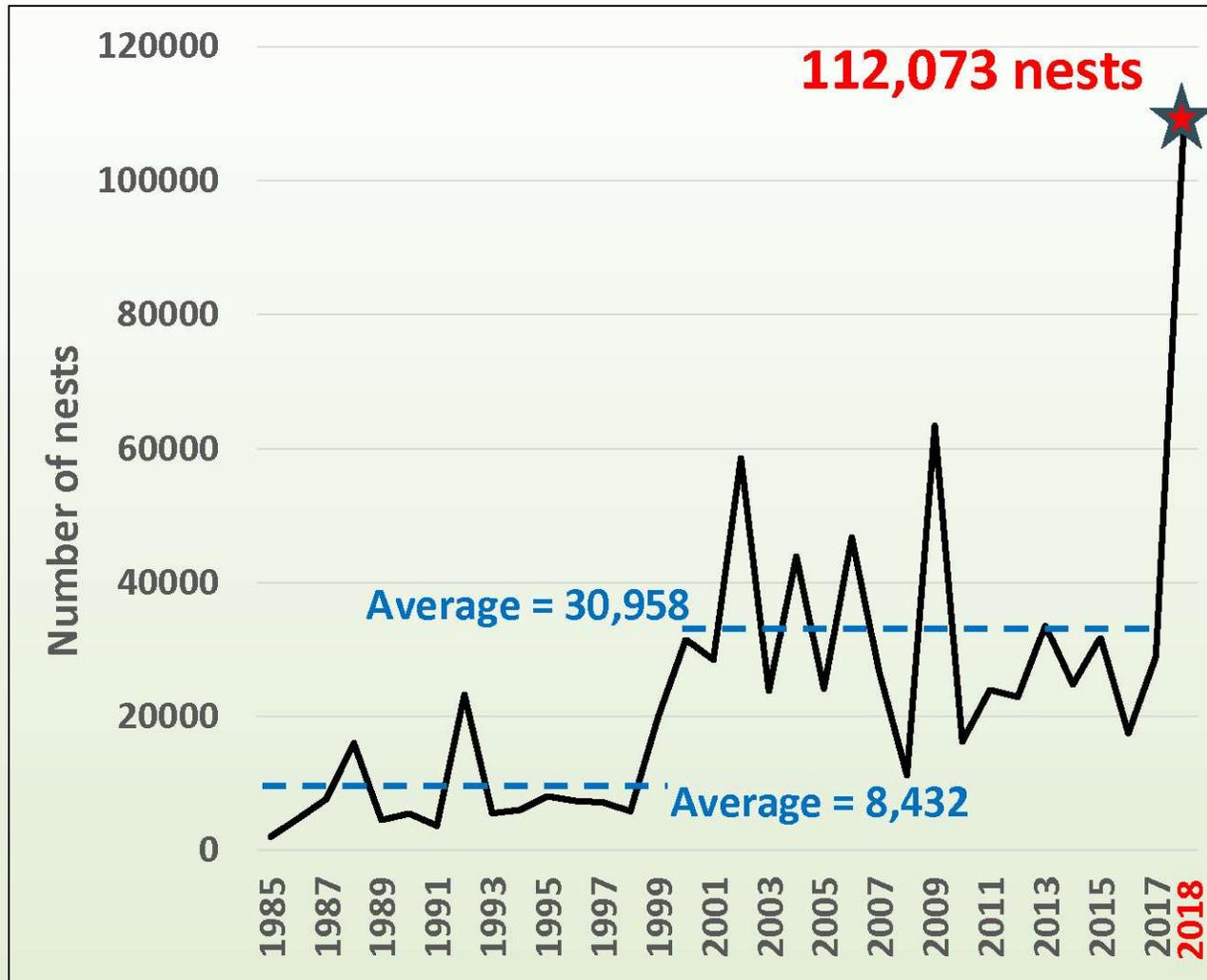
ENVIRONMENTAL BENEFITS  
ALREADY ACHIEVED



<https://vimeo.com/270275605>

Short film courtesy of Lori Oberhofer – ENP avain ecologist

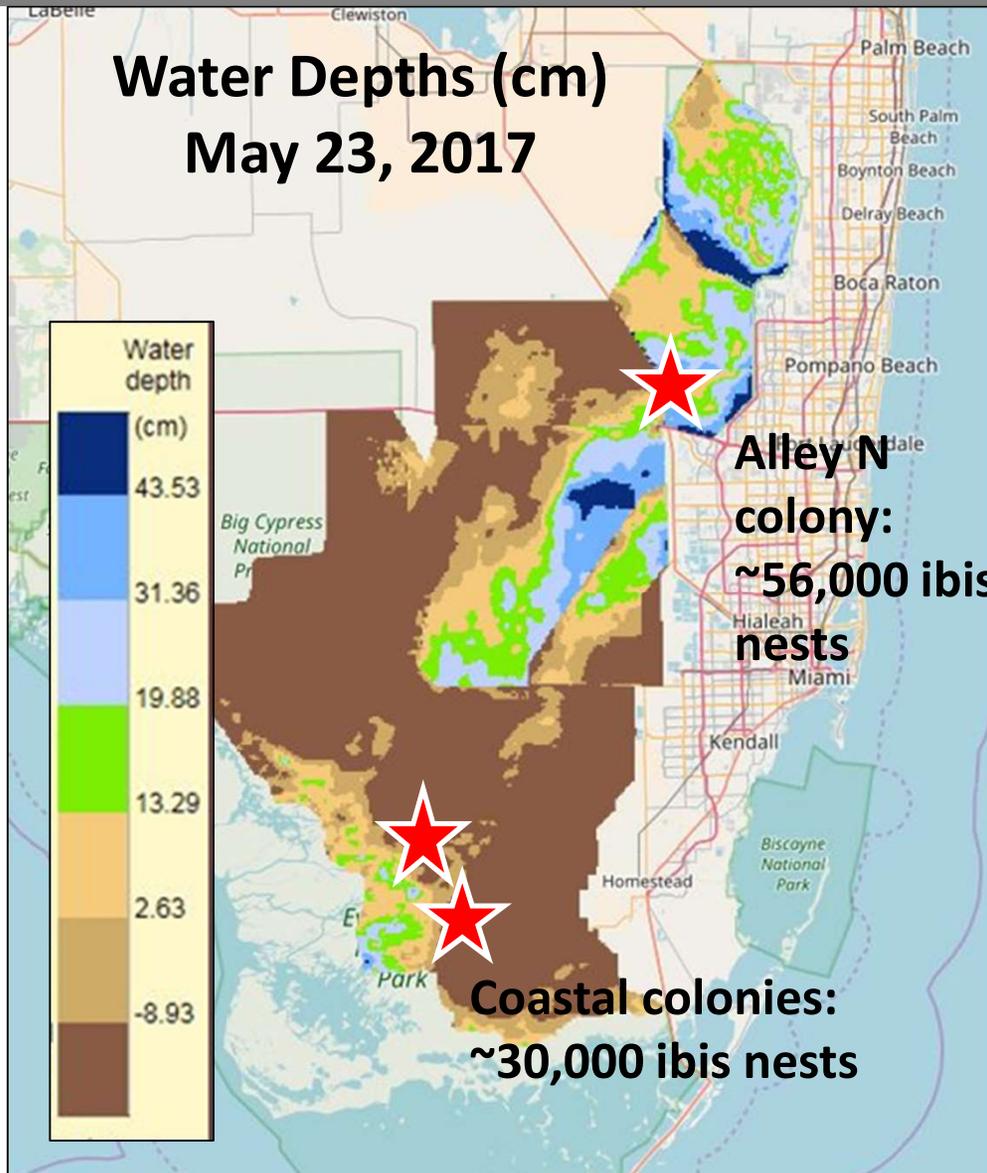
# Nesting effort in 2018 is comparable to that of the 1930's and 40's!



Slide courtesy of Dr. Mark Cook, lead ornithologist - SFWMD



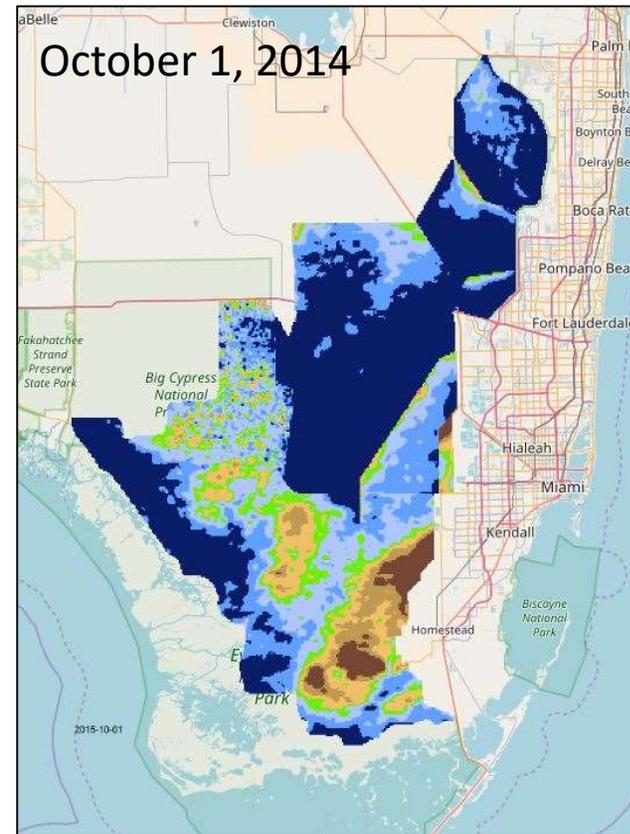
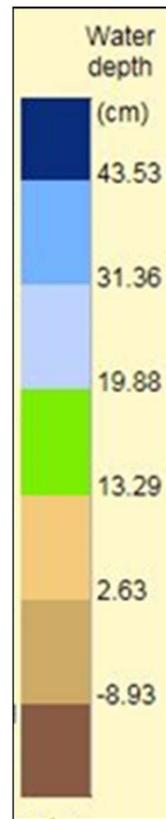
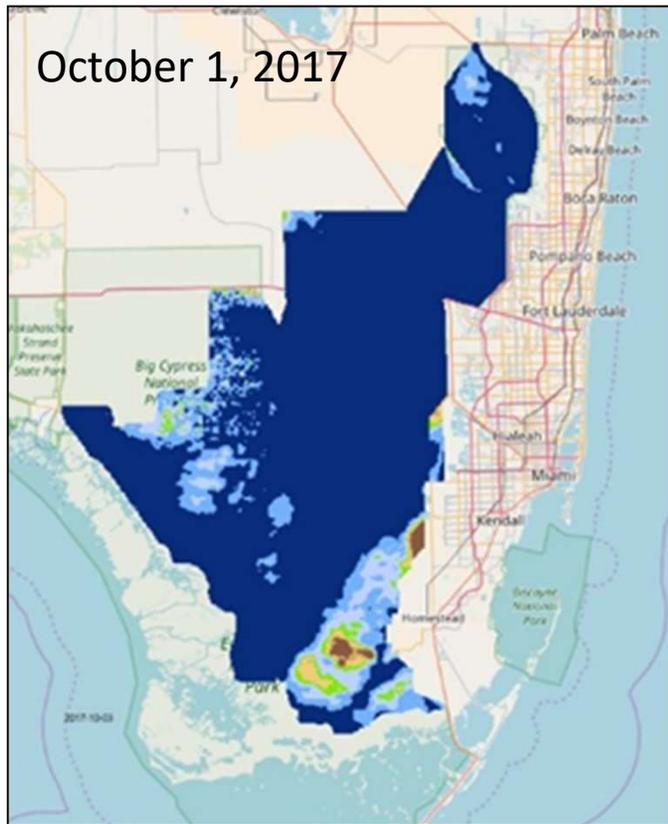
# Hypothesis 1: Relatively dry conditions during the 2017 dry season led to increased crayfish recruitment



Slide courtesy of Dr. Mark Cook, lead ornithologist - SFWMD

# Hypothesis 2: Extreme rainfall during the 2017 wet season led to increased crayfish and small fish production

Slide courtesy of Dr. Mark Cook, lead ornithologist - SFWMD

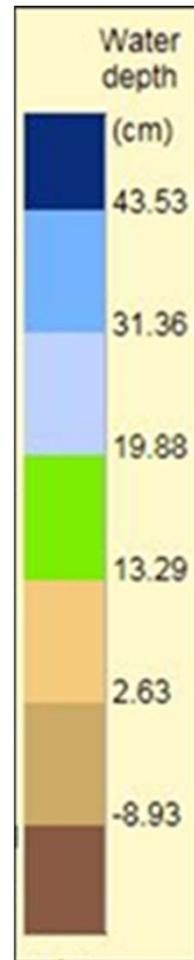
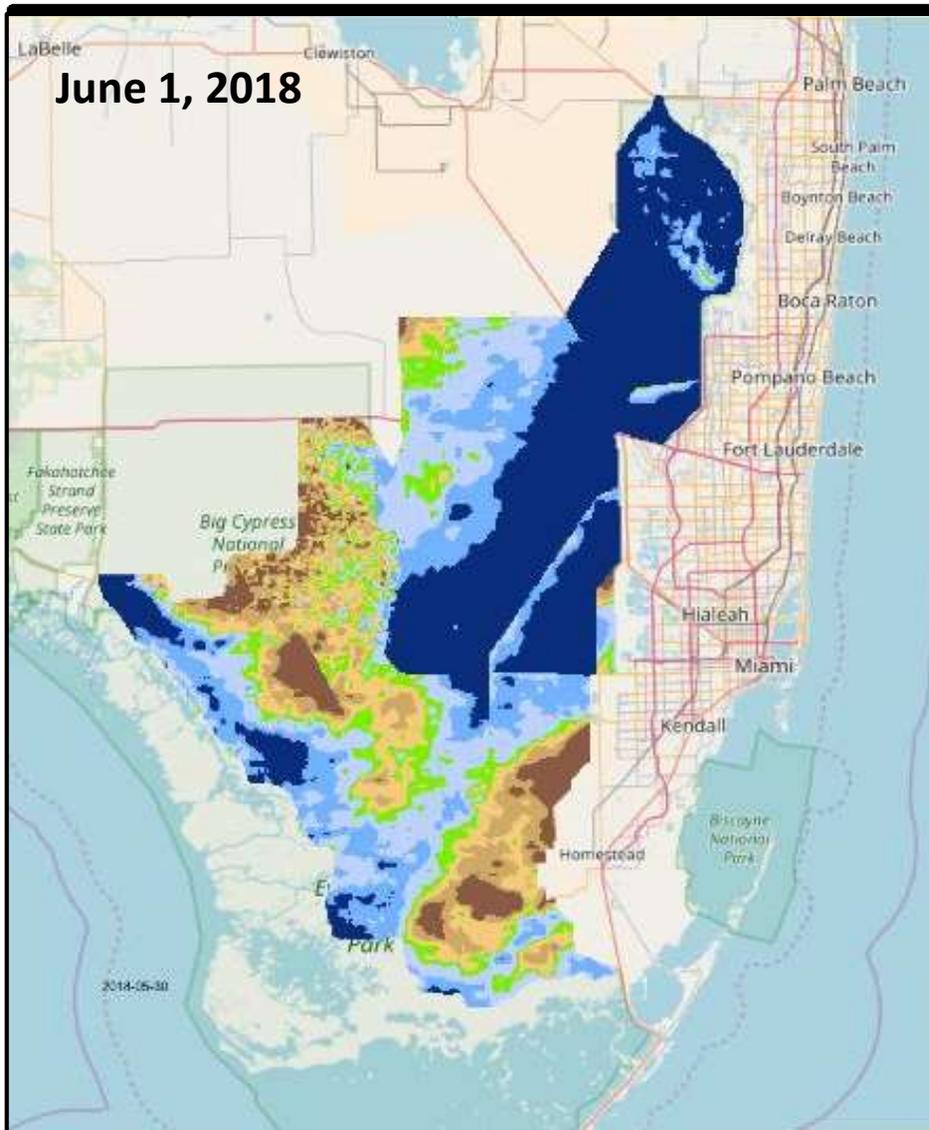


Record wet conditions associated with supranormal nesting in 2018

Average wet season conditions, with relatively short hydroperiods

**Hypothesis 3:** Consistent drying during the nesting season produced prey concentrations across the landscape at the right time & place

Slide courtesy of Dr. Mark Cook, lead ornithologist - SFWMD



Too deep

Optimal foraging depths

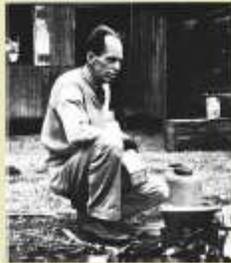
Too dry

Habitat suitability maps developed by Beerens et al. 2011

# A Century of Nesting in the Everglades



Guy Bradley



Alexander  
Sprunt Jr.



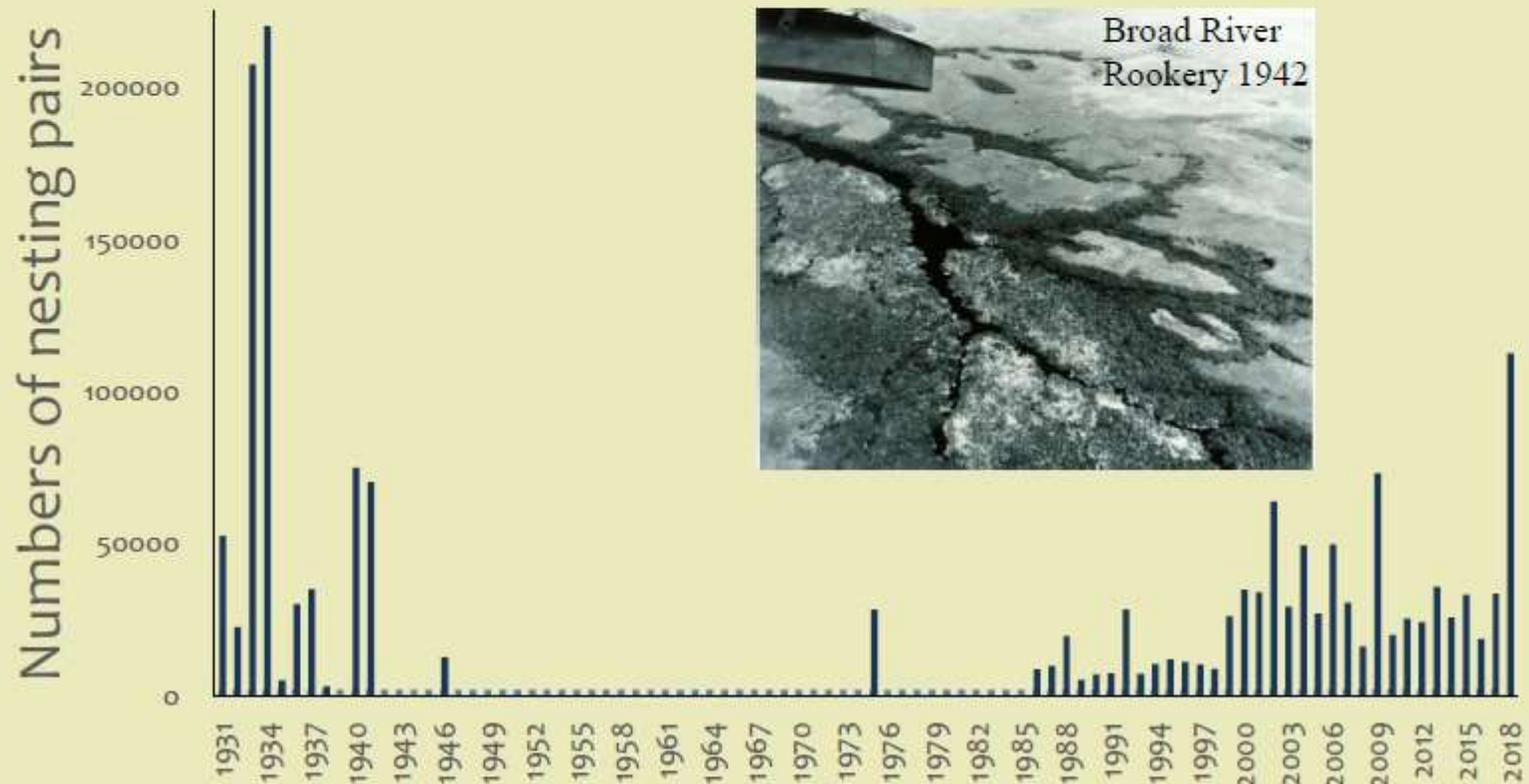
Robert Porter  
Allen



William Robertson



John C. Ogden



# Monthly volume deliveries across Tamiami Trail since 2012

LEGEND
Minimum Water Delivery
IOP
ERTP
Increment 1
2016 Emergency Deviation Increment 1.1/1.2
2017 Temporary Deviations
Increment 2
COP

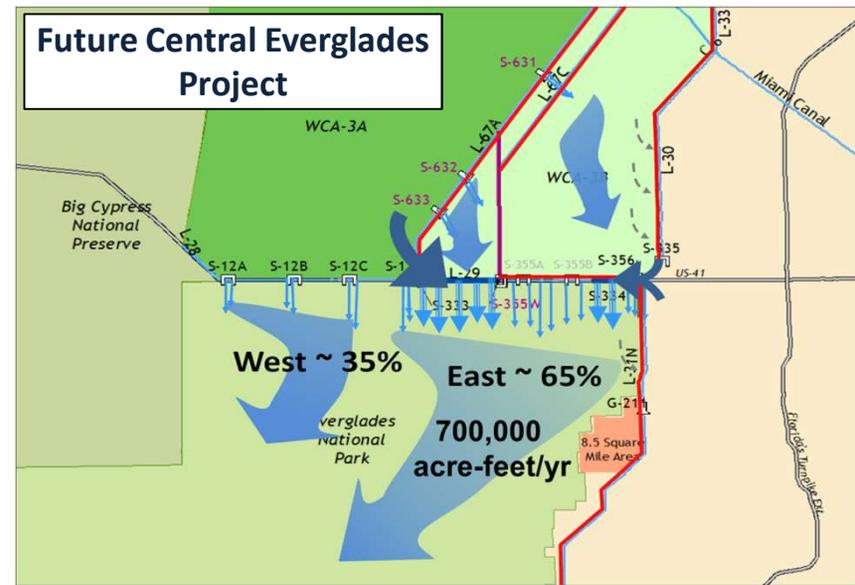
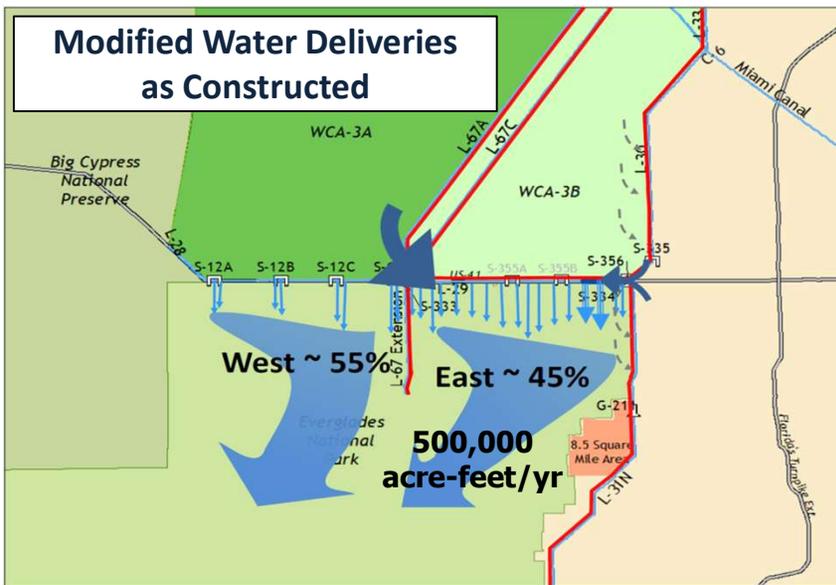
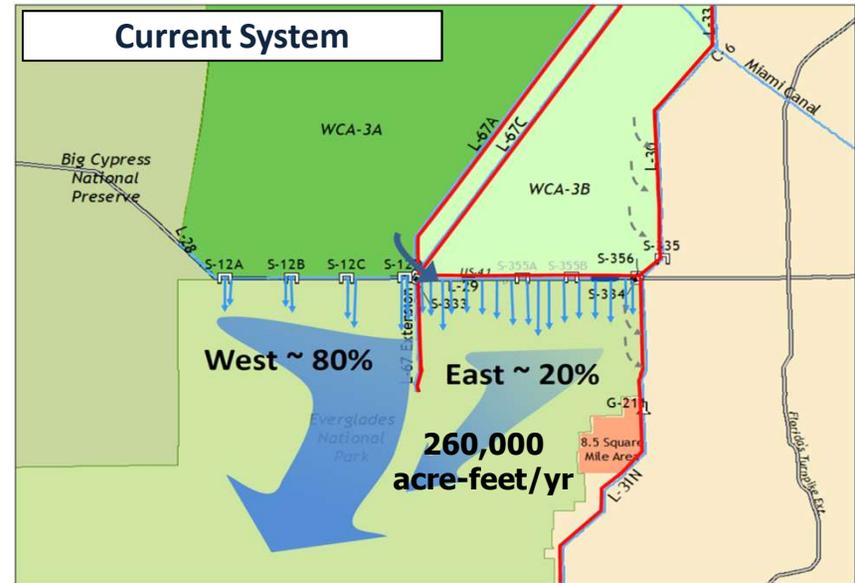
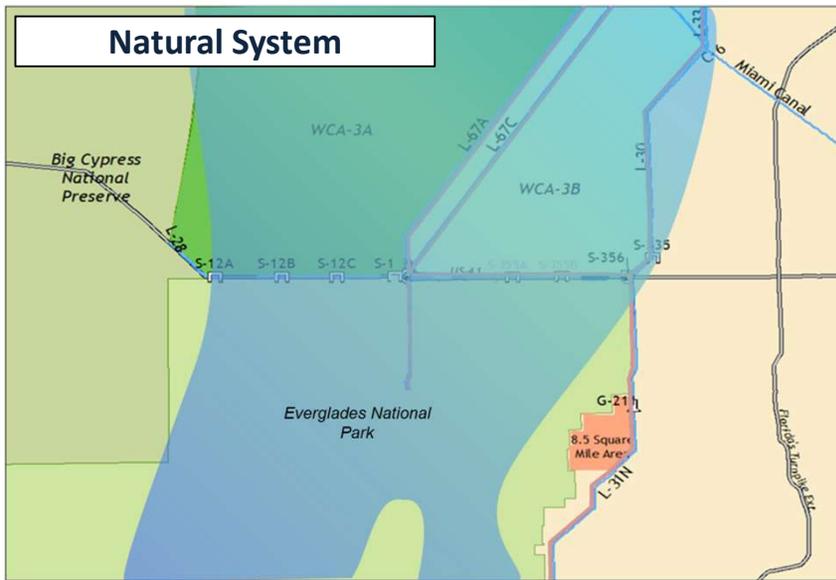


WCA-3A WATER DELIVERIES (AC-FT) TO SHARK RIVER SLOUGH (S-12s + S-333 + S-356 - S-334)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Min. Del. (PL 91-282 June 1970)	22,000	9,000	4,000	1,700	1,700	5,000	7,400	12,200	39,000	67,000	59,000	32,000	260,000
2012	32,700	13,300	5,900	700	25,600	44,900	71,500	87,000	115,000	177,900	123,900	105,600	804,500
2013	40,200	14,600	3,900	700	47,900	63,800	112,600	149,300	133,800	122,700	88,000	40,800	818,300
2014	6,400	43,000	55,200	600	100	12,300	61,700	75,500	101,600	100,500	91,200	23,700	572,100
2015	13,100	15,100	8,900	0	0	0	0	0	14,500	122,500	56,700	108,900	339,700
2016	108,500	180,800	203,100	127,400	61,600	44,300	66,900	79,400	110,700	120,100	76,100	8,000	1,188,200
2017	2,900	5,300	1,400	400	200	109,700	191,400	183,200	240,700	323,400	253,800	196,800	1,509,200
2018	97,000	37,400	3,100	900	31,100	105,700	149,300	157,500	163,100	127,100	1,400	200	873,800
2019													
2020													

Note: All data is provisional.

# Water Deliveries to Everglades National Park





# WCA-3A WATER DELIVERIES TO NORTHEAST SHARK RIVER SLOUGH<sup>23</sup>

WCA-3A WATER DELIVERIES (AC-FT) TO NORTHEAST SHARK RIVER SLOUGH (S-333 + S-356 - S-334)*													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2012	16,400	7,700	1,400	300	15,000	14,000	700	3,400	-200	-300	400	8,200	67,000
2013	18,900	8,200	2,200	500	26,400	18,200	3,500	1,000	-1,500	-700	0	0	76,700
2014	800	29,300	30,700	400	100	9,800	44,000	15,800	16,300	0	31,800	12,400	191,400
2015	1,700	0	5,700	0	0	0	0	0	6,400	36,700	26,300	8,600	85,400
2016	8,100	28,700	74,400	65,700	25,900	11,100	30,600	10,800	500	100	0	7,700	263,600
2017	2,700	5,200	1,300	300	100	33,300	10,500	0	20,300	700	4,100	45,500	124,000
2018	9,700	21,600	3,100	900	14,600	31,600	60,400	72,000	52,400	74,800	1,200	0	342,300
2019													
2020													

May-Oct	% of 2018	Ratio
32,600	11%	9
46,900	15%	7
86,000	28%	4
43,100		
79,000	26%	4
64,900	21%	5
305,800	100%	1

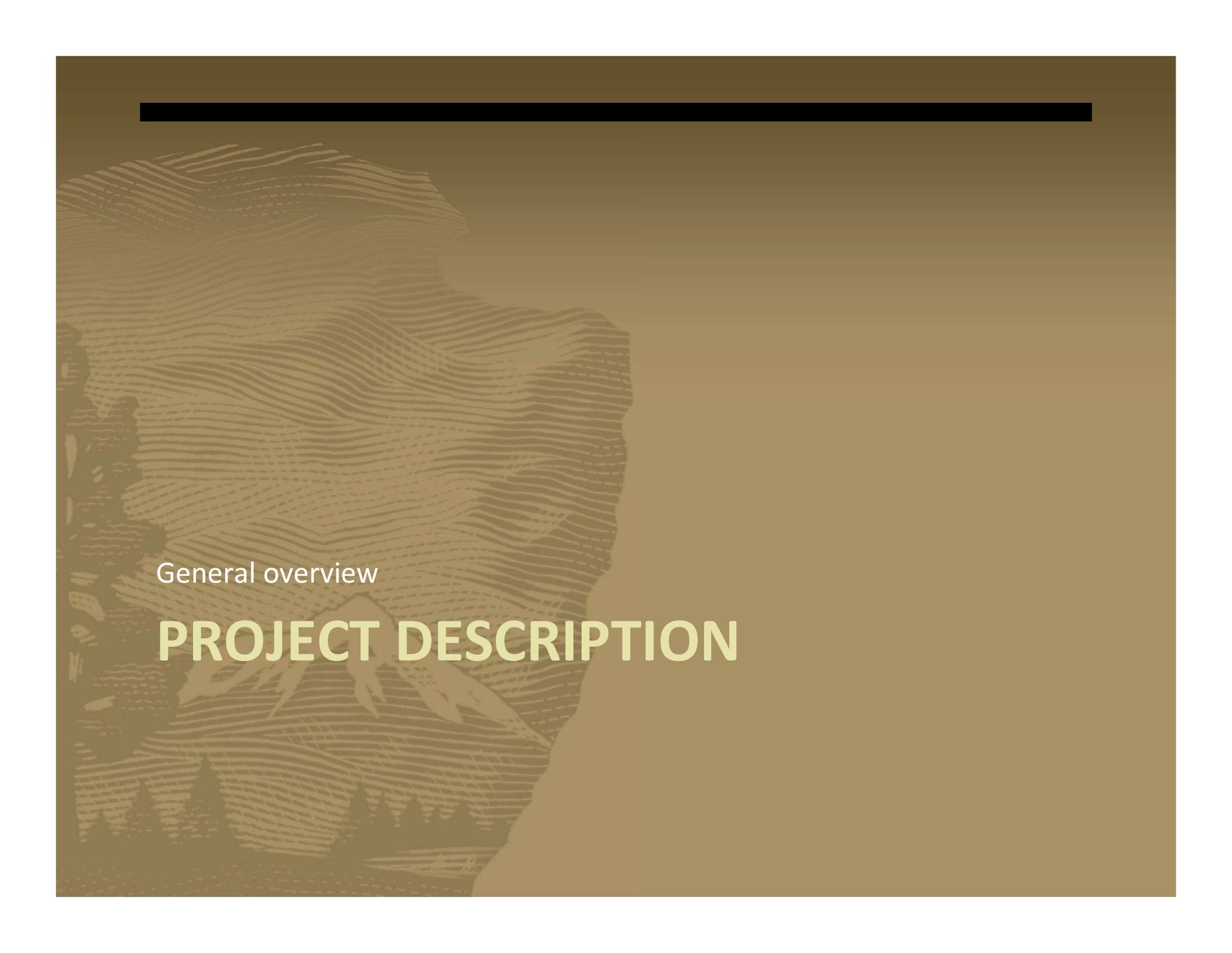
Note: All data is provisional.

LEGEND
Minimum Water Delivery
IOP
ERTP
Increment 1
2016 Emergency Deviation
Increment 1.1/1.2
2017 Temporary Deviations
Increment 2
COP



US Army Corps of Engineers.

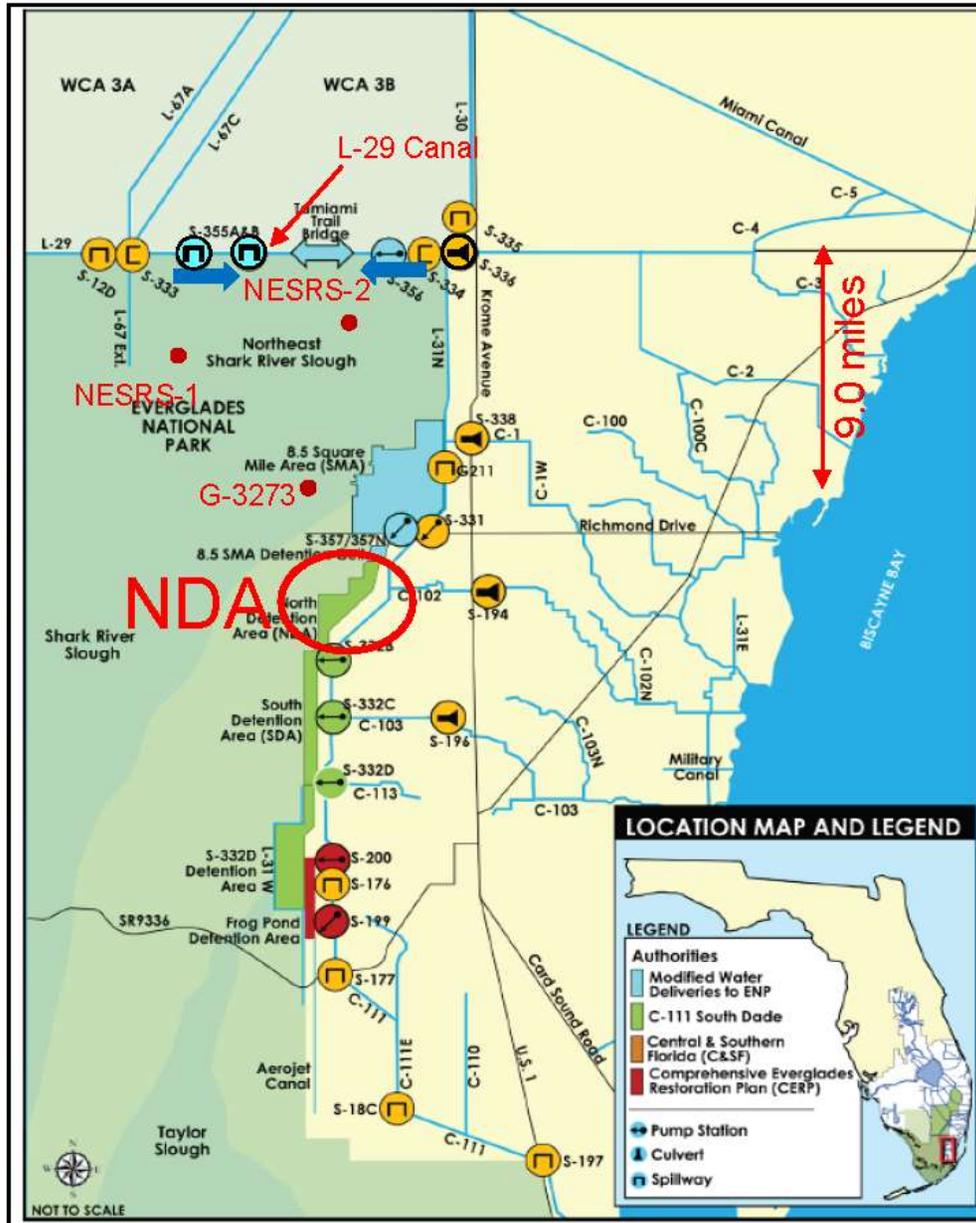




General overview

# PROJECT DESCRIPTION

# MWD/C-111SD COMPLETION



## Pump test - expectations

## Pump test - actual

Modified Water Deliveries: Improving Hydr...   

### Modified Water Deliveries:

#### Phased Implementation – Three Increments

The resulting plan includes three steps, or increments, to allow phased implementation of operations. Increment 1 is expected to produce small but important hydrologic benefits based on the additional water flow and seepage return. Increment 2 is expected to provide additional hydrologic and ecological benefits to NESRS and data collected during the first two increments will be used in Increment 3 to design a new operational plan for the system.

**Increment 1 (2015-2017)**– Relax constraints on gage G-3273, and test seepage control pump S-356, while maintaining the L-29 Canal at the current level, or stage, of 7.5 ft

**Increment 2 (2017-2019)** – Relax constraints on G-3273, and test seepage control pump S-356, while allowing the L-29 Canal to reach a maximum stage of 8.5 ft

**Increment 3 (2018-2021)** – Develop a new operational plan for the system using data collected during Increments 1 and 2.

Dryer than average wet season, followed by a wetter than average dry season (and record rainfalls in January 2016):

Increment 0: cycle testing of the pumps  
Sept 9, 2015 – Sept. 20, 2015

Increment 1: raising stage in L29 canal  
Oct. 15, 2015 – for a while, with some interesting challenges due to high rainfall

2/15/2016: Emergency deviation – up to 8.5 stage level may occur\*

12/2016: Emergency deviation ends

3/2017: Increment 1.1/1.2 begins

7/2017: 2017 Temporary deviation begins

12/2017: 2017 Temporary deviation ends, return to Increment 1.1/1/2 operations

7/2018: Increment 2 operations

10/2018: Old roadbed removal begins under 2.3 mile bridge

\* “The U.S. Army Corps of Engineers South Atlantic Division has approved a request from Florida Governor Rick Scott for deviation from its water control plan for a key Everglades reservoir located west of Miami.... The deviation raises the levels as high as elevation 8.5 feet, which would allow more water to flow from WCA-3 to Everglades National Park.”

# COP OBJECTIVES

1. Improve water deliveries (timing, location, volume) into ENP and take steps to restore natural hydrologic conditions in ENP given current C&SF infrastructure and features expected to be completed by the time of implementation , to the extent practicable by
  - a) Changing schedule of water deliveries so that it fluctuates in consonance with local meteorological conditions, including providing for long term and annual variation in ecosystem conditions in the Everglades (Timing) (P.L. 101-229, Section 101b)
  - b) Restoring NESRS as a functioning component of the Everglades hydrologic system (Location) (P.L. 101-229, Section 101b)
  - c) Adjusting the magnitude of water discharged to ENP to minimize effects of too much or too little water (Volume) (1992 MWD GDM, Section 44)



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## COP OBJECTIVES

2. Maximize progress toward restoring historic hydrologic conditions in the Taylor Slough, Rocky Glades, & eastern Panhandle of ENP.
3. Protect the intrinsic ecological values associated with WCA-3A and ENP.
4. Minimize the damaging freshwater flows to Manatee Bay/Barnes Sound through the S197 structure and increase flows through Taylor Slough and coastal creeks (1994 C-111 GRR, Section 5.2)
5. Include consideration of cultural values and tribal interests & concerns within WCA-3A and ENP.



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# COP Constraints

1. C&SF project purposes
2. 1962 Flood Control Act (P.L. 87-874) Authorizing Project Works in South Dade County
3. 1968 Flood Control Act (P.L. 9-483) Authorizing the SDCS
4. 1989 ENP Expansion Act (Everglades National Park Protection and Expansion Act of 1989, P.L. 101-229)
5. 1992 MWD GDM (1992 General Design Memorandum)
6. 1994 C-111 SD GRR
7. 2000 General Re-evaluation Report for the 8.5 SMA
8. L-29 Canal maximum stage (8.5 ft NGVD)(2008 Tamiami Trail LRR)
9. 2008 Tamiami Trail Modifications Relocation Agreement (FDOT/USA)
10. ERTP WCA-3A Regulation Schedule
11. 2016 Canal 111 South Dade Final LRR
12. 2016 MWD Completion Technical Analysis and May 2017 EA/FONSI



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# COP Planning Considerations

1. Burial Resources Agreement
2. Avoid or minimize adverse effects to cultural resources. Explore opportunities to develop monitoring protocols for “at risk” cultural resources
3. Water Quality Standards (CEPP language - Section 6.3.2 Paragraphs 1-4)
4. Maintain multi-species objectives (2012 WCP) and comply with requirements of the applicable BO from USFWS to include the July 2016 ERTF BO and the CERP C-111SC Western Project
5. Consider compatibility with future restoration actions including CEPP. Reasonably connect the planning under this project authority to other near-term changes that are likely to be implemented in the system in the next few years using an Adaptive Management framework.
6. Explore opportunities for enhancing the recovery of federally and state listed species under the Endangered Species Act, the USACE’s authorities for MWD and C-111 projects and operational considerations.
7. Explore opportunities to enhance flood control and mitigation.



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# COP PLANNING CONDITIONS

## 1983 Base

- Identifies level of flood mitigation that will be maintained in the COP process; represents the conditions in the 8.5 SMA before MWD implementation, and is consistent with requirements from the 8.5 SMA 2000 GRR ROD

## 1994 GRR C-111 South Dade Base

- Identifies the minimum level of flood protection that will be maintained in the COP process; legal parameter of flood protection; and needed for the close out of the project

## Existing Condition Baseline [2019] (No Action)

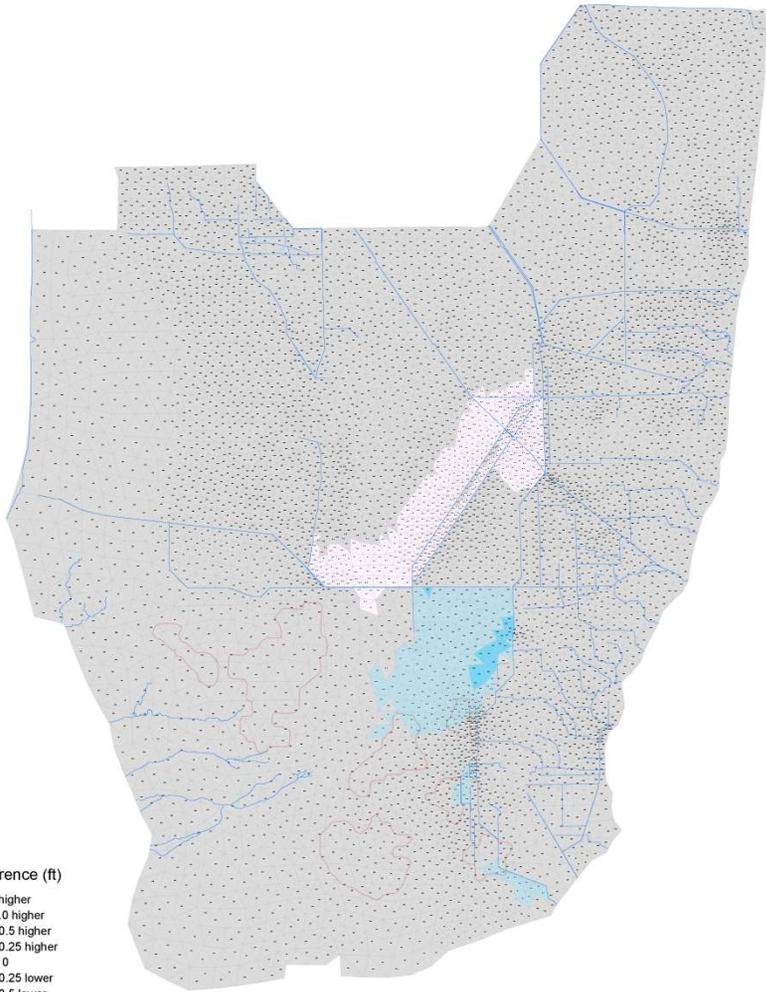
- Conditions assumed in place at the time of implementation of the COP WCP
- Increment 1.2



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# Average Annual Stage Difference in POS 1965-2005

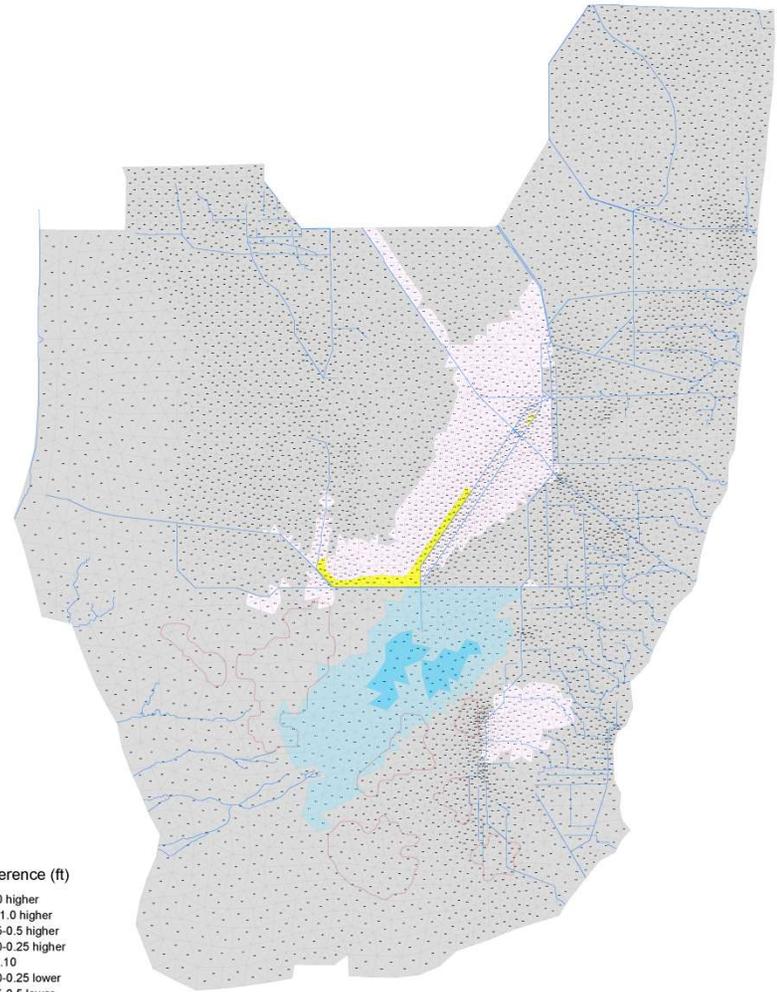


- Stage Difference (ft)
- >1.0 higher
  - 0.5-1.0 higher
  - 0.25-0.5 higher
  - 0.10-0.25 higher
  - +/- 0.10
  - 0.10-0.25 lower
  - 0.25-0.5 lower
  - 0.5-1.0 lower
  - >1.0 lower

Run Name: ALTO-ECB19RR  
Run Date: October 20, 2018



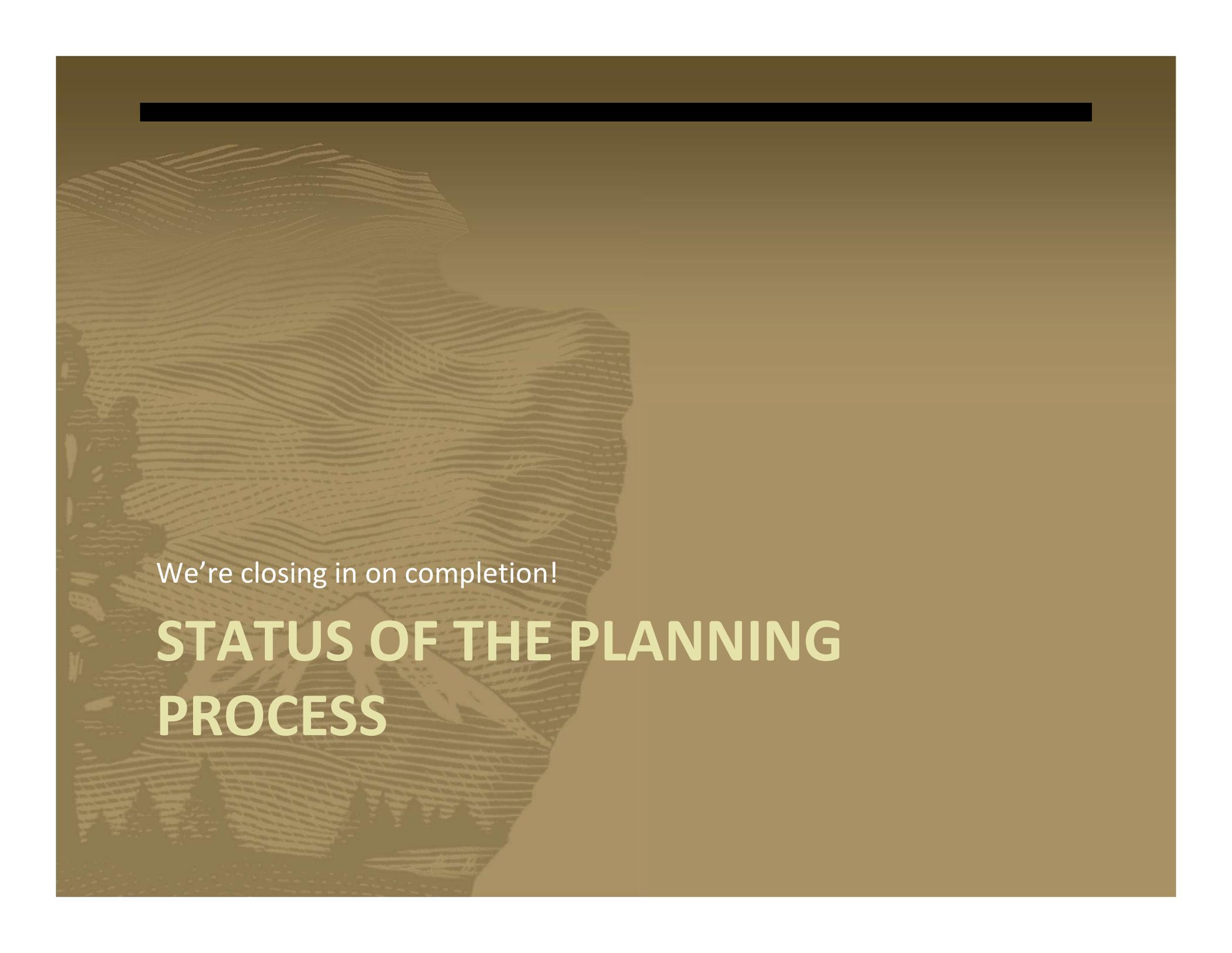
# Annual Average Stage Difference 1989



- Stage Difference (ft)
- >1.0 higher
  - 0.5-1.0 higher
  - 0.25-0.5 higher
  - 0.10-0.25 higher
  - +/- 0.10
  - 0.10-0.25 lower
  - 0.25-0.5 lower
  - 0.5-1.0 lower
  - >1.0 lower

Run Name: ALTO-ECB19RR  
Run Date: October 20, 2018





We're closing in on completion!

# STATUS OF THE PLANNING PROCESS

## ROUND 2 ALTERNATIVES:

### General Comments:

- Increase flow to Florida Bay
  - Florida Bay is dying and we need more fresh water
  - Importance of Florida Bay to economy
  - Freshwater specifically in dry season
  - Freshwater needed in Central Bay
- Increase flow to Taylor Slough
  - Clean, fresh water into Taylor Slough
- Water Quality Concerns
- Sea Level Rise
- Water Supply/Saltwater Intrusion/Economic Analysis
- Agricultural Concerns with Economic Analysis
- S-18C Incremental Testing



## ROUND 2 ALTERNATIVES:

### Comments on Specific Alternatives:

#### ALT O:

- Better Overall
- Step in Right Direction
- Needs to further provide flow to Taylor Slough
- Room to do more

#### ALT N2:

- Better for Biscayne Bay
- SR4



## PREFERRED ALTERNATIVE: AGENCY

	USACE	NPS	SFWMD	FWC	FDACS	FDEP
WCA 3A	O	O	O	N2	-	O
WCA 3B	O	O	-	O	-	O
NESRS	O	O	N2	-	O	N2
WSRS	O	O	N2	-	-	-
SDCS	O	O	O	O	O	O
TS	O	O	O	O	O	O
EAS/PAN	O	O	O	O	-	O
MB/BS/FB	O	O	O	O	O	O
BB	N2/SR4*	O/SR4	N2/O/SR4	N2	-	N2

File Name



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# NEXT STEPS

Alternative Q Comments Due	25 Mar 19
R3 Alternative Modeling	04 May 19
Round 3 Sensitivity Run(s)	26 May 19
Eco/Econ/WQ Alternative Evaluation	03 Jun 19
Recommendation of PPA	17 Jun 19
Preliminary Preferred Alternative	08 Jul 19
Monitoring and Adaptive Mgmt Plan	17 Jul 19



# NEXT STEPS - CONT

State, Agency, Tribes and Public Review of draft  
POM/EIS 06 Dec 19 – 20 Jan 20

State, Agency, Tribes and Public Review of dFinal  
POM/EIS 24 Apr 20 – 25 May 20

ROD 30 Jun 20



## Thanks so much

Special thanks to: Lan Do (USACE), Mark Cook (SFWMD), Donna George, and CERP Interagency Modeling Center (IMC) for contributing information, figures and slides.

